

REMARKS

Information Disclosure Statement:

Applicant notes that on the Form PTOL-326, the Examiner has indicated that an initialed IDS Form PTO-1449 has been returned by the Examiner. However, Applicant has not received an initialed copy of the IDS Form from the Examiner.

Therefore, Applicant hereby requests the Examiner return a copy of the initialed IDS Form PTO-1449, with the next official action.

Claim Rejections:

Claims 1-31 are all of the claims pending in the present application, and currently all of the claims stand rejected.

35 U.S.C. § 112, 2nd Paragraph Rejection - Claims 3 and 14:

Claims 3 and 14 stand rejected under 35 U.S.C. § 112, 2nd paragraph as being indefinite. Specifically, the Examiner asserts that the language “rear pulse detonation engines” is unclear, and that one of ordinary skill in the art would interpret this phrase to mean “pulse detonation engines with their exhaust directed toward the rear of the airfoil.” *See* Office Action, page 2, para. 2. In view of the following discussion, Applicant respectfully traverses the above rejection.

Applicant continues to disagree with the Examiner regarding the above rejection, and submits that the scope of the claims 3 and 14 would be clear to one of ordinary skill in the art. Specifically, claims 3 and 14 indicate that the airfoil has a “flap” located at the trailing edge of the airfoil, and that the “rear pulse detonation engines” are “distributed along said flap.” Thus, if the “rear pulse detonation engines” are distributed along the flap, and the flap is located at the

trailing edge of the airfoil, Applicant submits that one of ordinary skill in the art would be able to determine that the location and placement of the “rear pulse detonation engines.” Stated differently, in view of the language of the claims, the position location of the rear pulse detonation engines would be clear and definite to one of ordinary skill in the art.

In view of the foregoing, Applicant submits that the language of both claims 3 and 14 would be clear to one of ordinary skill in the art, under the provisions of 35 U.S.C. § 112, 2nd paragraph. Accordingly, Applicant hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 112, 2nd paragraph rejection of these claims.

35 U.S.C. § 103(a) Rejection - Claims 1-6, 8-18, 20-23, 25-29 and 31:

Claims 1-6, 8-18, 20-23, 25-29 and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,969,614 to Capuani in view of U.S. Patent No. 6,439,503 to Winfree et al. In view of the following discussion, Applicant respectfully traverses the above rejection.

As an initial matter, Applicant notes that the Examiner has replaced the Bradfield reference with Capuani. However, the Examiner’s use of Capuani does not advance the Examiner’s argument, and has little relevance to the present invention.

Capuani discloses an aircraft configuration where the propulsion jets 7 are placed above and forward of a central wing section 4, which is positioned between delta wing sections 3. Capuani teaches that the jets 7 have two nozzles 8 which “generate a wide, flat jet which is directed over the dorsal surface of the central wing 4 close to its trailing edge.” Capuani, col. 2, lines 24-27. This configuration is used to provide a single surface ejector system in which the jet

exhaust is combined with the relative air flow over the wing where mixing and recompression of the ejector are defined by the wing structure 4. This effect is generated due to the “Coanda effect” and is used to generate aircraft lift.

In view of this disclosure, and the intended purpose of the jets 7 in Capuani, Applicant submits that it would not have been obvious to replace the jet 7 with a PDE. Specifically, as is indicated in Winfree, PDE’s efficiently operate at about Mach 2 to mach 3.5. Applicant submits that one of ordinary skill in the art, having an understanding of aerodynamics, would understand and acknowledge that if the jets 7 were replaced with PDE’s operating at Mach 2 to 3.5, the alleged aerodynamic benefits of the configuration in Capuani would be lost.

It is understood by those of ordinary skill in the art that the benefits of the “Coanda effect” are achieved at subsonic flow, where the velocity of the air flow permits the flow to remain in stable contact with the wing surface. This would simply not occur at flow speeds which are supersonic. The behavior and characteristics of air flow at supersonic speeds are quite different than those at subsonic speeds, and the alleged benefits of the “Coanda effect” can not be obtained with flow traveling at Mach 2 to March 3.5.

Specifically, the benefits discussed by Capuani are achieved by mixing the jet exhaust with the relative air flow. One of ordinary skill in the art understands that such mixing could not occur with the exhaust of a PDE, which would be exiting the engine at, at least, twice the speed of sound. The aerodynamic forces involved with supersonic exhaust are significantly different than those provided by sub-sonic flow. Thus, one of ordinary skill in the art would not have

added PDE's, which, according to Winfree, are only efficient at super-sonic speeds, to the aerodynamic configuration disclosed in Capuani.

Applicant further notes that the above discussion is further supported by the disclosure found in U.S. Patent No. 4,478,378 to Capuani. The '378 patent is referenced in the disclosure of the Capuani reference used by the Examiner, and the '378 patent indicates that the benefits attained from this configuration are a result of "supercirculation" of the exhaust gas and relative air flow over the wing 4. Applicant submits that such "supercirculation" could not occur with the exhaust of a PDE, which efficiently operates a velocity of at least Mach 2, according to Winfree. Thus, one of ordinary skill in the art would not be motivated to take the engines disclosed in Winfree and add them to the aircraft of Capuani, to result in the elimination of the very aerodynamic benefits taught by Capuani.

Additionally, it is well known that the thrust provided by a PDE is a "pulse" and is not a steady flow of exhaust, as from a typical turbojet or turbofan engine. Thus, the "pulsing" nature of a PDE would also inhibit the mixing, as required by Capuani, resulting in the overall degradation of flight performance of the aircraft disclosed in Capuani.

Additionally and independently of the above discussion, Applicant submits that the Examiner's arguments and discussion fail to satisfy the requirements under the current state of the law regarding obviousness. Specifically, the Examiner asserts that it would have been an obvious matter of design choice to place the PDEs at the leading edge of the airfoil. First, the Examiner appears to be applying a rule of *per se* obviousness, which has been found to be improper. See In re Ochiai, 71 F.3d 1565, 1570, 37 U.S.P.Q.2D (BNA) 1127, 1132 (Fed. Cir.

1995). Second, the jets 7, in Capuani, are positioned on an upper surface of a central wing 4, where the central wing 4 has no leading edge. Namely, the central wing 4 is an extension of the aircraft body and extends between the split delta wings 3. There is no leading edge to the wing portion 4. Thus, any assertion by the Examiner that it would be obvious to place the PDEs on the leading edge is without merit as there is no leading edge of the wing 4 to place them on.

In addition to the above arguments, with regard to claims 2, 10, 13, 21, and 26 Applicant notes that Capuani expressly teaches against placing the jets 7 below the airfoil 4, because Capuani is using the jets 7 to provide lift. As indicated previously, Capuani discloses using the Coanda effect to produce lift on the surface 4. Thus, the jets 7 must be placed above the airfoil. There is no teaching or suggestion of any other configuration.

Finally, Applicant also notes that contrary to the Examiner's assertions, the above references, taken either individually or in combination, fail to teach or suggest each and every feature of the claims 3, 4, 5, 14 and 22. Namely, there is no teaching in either of the references of having pulse detonation engines along or near the trailing edge of an airfoil, particularly the portion 4. Additionally, there is no teaching or suggestion of a PDE flap, or any kind.

In view of the foregoing, Applicant submits that one of ordinary skill in the art would not have found it obvious to replace the jets 7 in Capuani with PDEs, as the use of PDEs would not result in the desirable aerodynamic interactions taught by Capuani. Therefore, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness with respect to claims 1-6, 8-18, 20-23, 25-29 and 31, as required under the provisions of 35 U.S.C. § 103(a).

Accordingly, Applicant hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 103(a) rejection of these claims.

35 U.S.C. § 103(a) Rejection - Claims 7 and 24:

Claims 7 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Capuani in view of Winfree, in further view of U.S. Patent No. 5,896,742 to Black et al.

However, as these claims depend on claims 1 and 21, respectively, and because Black fails to cure the deficient teachings of Capuani and Winfree, Applicant submits that these claims are also allowable, at least by reason of their dependence.

35 U.S.C. § 103(a) Rejection - Claim 19:

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Capuani in view of Winfree, in further view of U.S. Patent No. 5,901,550 to Bussing et al. However, as this claim depends on claim 1, and because Bussing fails to cure the deficient teachings of both Capuani and Winfree, Applicant submits that this claim is also allowable, at least by reason of its dependence.

35 U.S.C. § 103(a) Rejection - Claim 30-31:

Claims 30-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bussing and Winfree in view U.S. Patent No. 5,909,475 to Wells et al. In view of the following discussion, Applicant respectfully traverses the above rejection.

Applicant has amended claims 30 and 31 as shown. Because neither of the Bussing and Winfree references teach or suggest an aircraft having an engine as set forth in claim 30,

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 10/065,815

Our Ref.: A8697
Art Unit: 3641

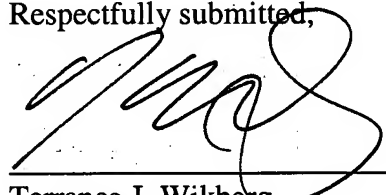
Applicant submits that these claims are allowable, and hereby requests the Examiner reconsider and withdraw the above 35 U.S.C. § 103(a) rejection of these claims.

Conclusion:

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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CUSTOMER NUMBER

Date: June 18, 2004